Studies in Second Language Learning and Teaching
Department of English Studies, Faculty of Pedagogy and Fine Arts, Adam Mickiewicz University, Kalisz
SSLLT 1 (2). 209-225
http://www.ssllt.amu.edu.pl

# *Using tracking software for writing instruction*

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Abstract

Writing is a complex skill that is hard to teach. Although the written product is what is often evaluated in the context of language teaching, the process of giving thought to linguistic form is fascinating. For almost forty years, language teachers have found it more effective to help learners in the writing process than in the written product; it is there that they could find sources of writing problems. Despite all controversy evoked by post-process approaches with respect to process writing, information technology has lately offered tools that can shed new light on how writing takes place. Software that can record keyboard, mouse, and screen activities is capable of unraveling mysteries of the writing process. Technology has given teachers and learners the option of examining the writing process as it unfolds, enabling them to diagnose strategy as well as wording problems, thus empowering teachers to guide learners individually in how to think about each of their trouble spots in the context of a specific product of writing. With these advances in information technology, metacognitive awareness and strategy training begin to acquire new dimensions of meaning. Technology lays open aspects of the writing process, offering unprecedented insight into creative text production as well. This paper attempts to explain how tracking software can influence writing instruction. It briefly examines the process and post-process approaches to assess their viability, explains the concept

of tracking software, proposes methodology needed for the adoption of this technology, and then discusses the pedagogical implications of these issues.

*Keywords*: tracking software, metacognition, writing, pedagogy, TEFL, CALL

Writing is an extremely complex skill that is hard to teach. Although the written product is what is often analyzed and evaluated in the context of language teaching, the process of giving thought to putting together linguistic form in order to create a text is truly fascinating. For almost forty years, many language teachers have considered it more effective to help learners in the very writing process than in the written product; it is there that they could find sources of writing problems.

Despite all the recent controversy that the post-process approaches might have evoked about process writing, technology has lately provided tools that offer new insights into how written language originates. One example of such technology is the eye-tracker which uses cameras and infrared illuminators to record eye position, cornea reflections, and pupil size. Eye tracking traces eye movements and measures gaze locations, time length of fixations, and pupil dilation. Eye tracking has been used to research reading (e.g., Rayner, 1998) and writing (e.g., Andersson et al., 2006; Hacker, Keener, & Kircher, 2009). It does so in order to index human behavior and reflect how it is affected by acquired information, where attention is focused, what emotional state the beholder is in, and what brain activity he or she is involved in during the process of reading and writing. Another example that is of concern here is the software that can record keyboard and mouse activity, and capture all that takes place on the computer screen. This information technology (IT) is capable of unraveling some of the mysteries of the writing process. IT has given the teacher and the learner the opportunity to examine the writing process as it unfolds, enabling them to diagnose strategies used as well as articulate problems and, thus, empowering the teacher to guide the learner individually in how to think about each of their trouble spots in the context of a specific product of writing. With these advances in IT, such concepts as metacognitive awareness, individualized instruction, learner independence, collaborative learning, teacher and peer feedback, and strategy training have acquired new dimensions of meaning. IT lays open aspects of the enigma of the writing process, offering unprecedented insight into creative text production such as the making of fiction, non-fiction, poetry, translation, and so forth.

This paper attempts to explain how tracking software can influence writing instruction as well as to offer pedagogical implications. To this end, it will briefly

examine the process and post-process writing approaches to assess their viability, explain the concept of tracking software, propose a pedagogy which adopts this technology, and then discuss the practical implications of its adoption.

## Process and Post-Process Writing Approaches

The enigma of writing has perplexed people for hundreds of years so much that George Orwell likens it to an exhausting struggle, to "a long bout of some painful illness" and views the writer as being driven by some demon who can neither be resisted nor understood (Orwell, 1946, p. 316). Although it would hardly be true that Orwell had to face such a struggle because of lack of good ideas or lack of good writing strategies, it is most likely the case that all writers struggle when they want to verbalize ideas that are fuzzy; after all, writing is a tool for idea crystallization.

Process writing is a teaching approach that shifts focus from the product to the process of writing, shifts from a belletristic focus on literary style and linear rhetorical organization to nonlinear recursive exploration and self-expression, and shifts from a model-based approach to a process of repetitive planning, drafting, revising, editing, and publishing. It is a writing-centered paradigm which, in addition to the consideration of the purpose, audience, and context of writing, fosters strategies for discovery and invention through recursiveness in the writing process. It further distinguishes between aims and modes of discourse (Hairston, 1982). Emig (1971) pioneered the process approach to teaching writing when she asked her students to compose their essays aloud verbalizing everything that came to mind as they wrote. The approach has also been supported and promulgated by other scholars such as Perl (1979), Sommers (1980) as well as Flower and Hayes (1981).

In spite of the widely recognized value of the process-writing approach, the major drawbacks are that writing behavior is not universal or strictly code-governed, and that different contexts require different writing processes (Atkinson, 2003). Hence, the post-process view negates that it is possible at all to talk about writing as a 'process' which can be codified adequately or taught properly. This claim is based on the premise that human communication cannot be modeled (Olson, 1999). Post-process, however, should not be viewed as a total rejection of the process paradigm but rather as an extension to it (McComiskey, 2000). In fact, Atkinson (2003) argues that "the usefulness and power of process writing has been revealed time and again" (p. 10).

At last, IT has offered theorists and practitioners alike tools that enable them to peep into the writing process as it takes shape. Tracking software makes it possible for the teacher and the theoretician to witness the making of

a written product as it unfolds second by second, thereby enabling them to infer the cognitive activity associated with the visible behavior of the writer. It must be cautioned, however, that the use of such software is hinged on the assumption that what takes place on the computer provides to a greater or lesser extent a valid reflection of the writer's cognitive processes. In reality, however, some writers do not act on an impulse and they are more reflective; therefore, they would have longer contemplative pauses without any computer activity correlatives.

## Tracking and Capturing Software

Tracking all interactions with the computer is technically possible and consequently useful. Whether a command is clicked on in a graphical user interface or a key on the keyboard is pressed, whether text is typed in or picture, video, or sound files are edited, a code is always produced. A log can be made of all the sequences of codes projected on the screen or produced by the click of a mouse or the press of a key. It is the log of such sequences of codes that the tracking software uses to depict the actions of the computer user. There are multiple tracking software programs that can be used to teach writing. To name but a few, the more recent ones include SciptLog (Holmqvist, Johansson, Stromqvist, & Wengelin 2002), InputLog (Leijten & Van Waes, 2006), Translog (Jakobsen, 2006), Camtasia and Snagit (TechSmith, 2011), and WinWhatWhere Investigator, whereas examples of older tracking software include Comptrace, Writing Environment, Keytrap, ScreenRecorder, and Scriptkeel.

### Tracking Software as a Research Tool

The use of tracking software as a research tool is well-recognized in the literature (cf. Sullivan & Lindgren, 2006). It has been used as a tool for the observation of writer behavior, for reflection on the cognitive processes associated with writing, and for the analysis of a writer's consideration of genre, audience, topic development and linguistic form. Some studies have used it to assess written narratives (cf. Asker-Amason, Wengelin, & Sahlen, 2009), to explore the human translation behavior (Carl, 2010), to support persons with cognitive disabilities (Carmien & Fischer, 2008), to investigate the interplay between aphasia and text production (Behrns, Ahlsen, & Wengelin, 2010), to study journalistic discourse production (Van Hout, 2007), to describe the adaptation of process texts produced by a speech recognition system (Leijten & Waes, 2005), to bridge the gap between students' technology skills and the

demands of developing an electronic portfolio (Gladhart, 2007), and to foster collaborative story-writing (Chung & Walsh, 2006).

## Tracking Software for Writing Instruction

Regardless of the teaching approach that is adopted, tracking software can be used in a product-focused approach, a process writing approach, or a post-process approach. Within the product orientation, the prose model aspect lends itself well to tracking. Learners can be asked to have tracking on as they answer questions on a model essay that they consider prior to the task of essay writing. Tracking is not only useful at the stage of students' emulation but also valuable for teacher stimulation of analysis and reflection on the model essay. Within the process approach to writing, tracking software may be used at each writing stage beginning from planning to drafting and revising. For instance, with the help of such technology, the teacher can offer exercises that would get learners to use such brainstorming software as FilmFiler, Idea Cruncher, WinFlow, StoryRight, and so forth. The revision stage is where tracking is most useful. Some students may rush through the revision stage; hence, it would be wise to require that tracking be utilized during revision. Finally, within the post-process approach, tracking software is equally useful. Although the post-process approach calls into question the possibility that the "writing process can be described in some way" (Olson, 1999, p. 7), teachers can use tracking to enhance learner consciousness of writing as a social activity that involves a reader and the consciousness of it as an activity situated within a specific context. Keeping track of students' writing behavior facilitates teacher feedback and makes it all the more pertinent. Teachers could in fact encourage learners to think not only about the background of a potential reader, shared knowledge, and so forth, but also to develop metacognitive awareness of the writing activity itself.

## The Uses of Tracking Software

Tracking software is useful in giving feedback to learners. The traditional underlining, annotating, commenting, and occasional rephrasing have for a long time been regarded as having little value because more often than not learners ignore all of this information and stop at the letter grade assigned to their essays (cf. Truscott, 1996). In lieu of post-dated written feedback, replaying a student tracking video would facilitate offering live feedback in a private conference or in a group discussion. The replay of composition activities reminds the learner of the mindset that he or she had when they took one deci-

sion after another as they constructed their sentences and arguments. Therefore, the live feedback given during this process of idea rebirth might become most relevant and make a lasting impact.

Tracking software is ideal for the individualization of instruction, which is increasingly becoming more difficult, given the new tendency to have large class sizes. Individualization is a learner-centered approach to teaching in which the curriculum design makes allowances for individual learner differences and where the teaching goals are based on individual learner needs. A low-performing student who is lagging behind his or her class could be given an assignment to work on individually while the teacher attends to the rest of the class. If the tracking is on, the teacher would be able to comment on the specific set of problems that such students suffer from and could guide them to the right process that they would need to follow. By the same token, good students who are ahead of their class could also be given an assignment to work on individually with tracking enabled. Also in this case, the teacher could individualize his or her guidance and tailor-make their teaching by using the tracking feature.

As language learners are supposed to assume maximum responsibility for their own learning and are encouraged to become autonomous, collaborative learning becomes all the more valuable. However, teachers need to keep tabs on student in-class activities to ascertain that learning is taking place. Before a collaboration session starts, the teacher may instruct students to turn tracking on to facilitate subsequent teacher guidance and advice (Berzsenyi, 2001).

Education aims to produce life-long learners who are capable of acquiring knowledge independently; hence training them in the procedures and strategies used in learning, critical thinking, problem-solving, and communication is a form of indispensible empowerment. Strategy training is facilitated by turning tracking on while teachers verbalize their own thinking processes as they compose an essay or while directly explaining the value and purpose of each strategy that they want the student to learn and practice. They can focus on the metacognitive strategies of planning, self-monitoring, and self-evaluation. Thus, tracking is instrumental in teaching embedded strategies and in explicit strategy training. The added advantage is that students can take home the teacher's tracking video and replay it as often as they need to appreciate the concepts further.

## Tracking Software and Metacognitive Awareness

Perhaps the most appropriate use for tracking is indeed in a situation where students are the center of the learning process and where there is emphasis on how learning is achieved, that is, in the context of metacognitive

awareness. Metacognitive knowledge is awareness of the mental processes associated with learning. There are two types of metacognitive skills: self-assessment, where the learner evaluates their own cognition; and self-management, where they direct their own cognitive development (cf. Wenden, 1998). It involves thinking about the mental processes required in a specific instance of learning, monitoring learning as it takes place, and assessing a learner's own learning at the conclusion of the process. Metacognitive knowledge is widely thought to influence learning (e.g., Abraham & Vann, 1987; Horwitz, 1988; Macaro & Erler, 2008; Schoonen, Hulstijn, & Bossers, 1998; Vandergrift, 2005).

In particular, metacognitive awareness substantially enhances learning. Dickinson (1995) reviewed the literature on cognitive motivation and concluded that learning success and enhanced motivation are contingent upon learners' perception that "their learning successes or failures are to be attributed to their own efforts and strategies rather than to factors outside their control" (p. 174). In a study of the effect of beliefs about the nature of knowledge on comprehension, Schommer (1990) provided empirical evidence that correlated the type of cognitive awareness with the degree of text comprehension. Schoonen et al. (1998) studied the relative contribution of Dutch students' metacognitive and language-specific knowledge to the comprehension of their native Dutch versus English as a foreign language. They learned that metacognitive knowledge had no significant relationship with language-specific knowledge; yet, metacognition appeared to play a significant role in both native and foreign language reading comprehension. Goh (1997) called for more in-class discussion to increase learners' metacognitive awareness after her student diary study had revealed that second language learners had clear ideas about their own role and performance in the learning process.

Research on the value of metacognitive knowledge has been accelerated in the last decade or two with numerous researchers confirming the contribution such knowledge makes to language learning. Chang and Shen (2010) compared the beliefs about language learning among 250 junior high Taiwanese students and their language learning strategies, finding out that there was a significant relationship between them. Macaro and Erler (2008) reported that reading strategy instruction that they had provided to 62 pre-teen British children had succeeded in enhancing comprehension of both simple and elaborate French texts, bringing about changes in strategy use, and improving attitudes toward reading in general. Nakatani (2005) examined the effect of awareness-raising training on oral communication strategy use and found that the participants significantly improved their oral proficiency test scores and that general awareness of oral communication strategies was partly responsi-

ble for their success. Vandergrift (2005) examined the relationships among motivation, metacognition, and proficiency in listening comprehension among 57 adolescent learners of French and provided empirical support for the links between self-determination, self-regulated learning, learner autonomy, and metacognition. Since metacognitive knowledge is beneficial to language learning, tracking software could be used to build such awareness or enhance it.

Although metacognitive awareness can be developed by means of the classical procedure of student-teacher conferencing, such metacognitive instruction can benefit more from IT tracking technology. If tracking is enabled during the composition of an essay on the computer and the think-aloud protocol is utilized, not only does metacognitive instruction become easier but so does cognitive strategy training because tracking enables the teacher to witness essay creation as it develops. Student-teacher conferencing, on the other hand, relies on only what the student remembers of the writing decisions that he or she made when they were composing the essay days before. The major advantage of student-teacher conferences being independence of equipment is outweighed by the pedagogical value of bringing to life the act of essay writing.

One approach to teaching metacognitive awareness could involve fostering it right at the very beginning of a writing lesson. Before teachers explain the first stage of essay writing, for example, they may need to bring into focus the very purpose of the essay to be accomplished and the type of audience whom it addresses. Then, they may need to demonstrate how the purpose and audience interact and affect every decision that the writer takes at discourse, paragraph, and sentence levels. They may also show how the goal of communication determines the strategy for achieving it. It might also be necessary to illustrate how composition planning is influenced by the conscious knowledge of purpose and audience and how these affect the process of gathering information and preparing for the composition.

To explicitly promote writer reflection, teachers may avail themselves of the use of IT by composing an essay on the computer, outside the class, with tracking turned on. As they consider what to do before the composition process has started, they can verbalize their thoughts in a think-aloud protocol, asking such questions as the following:

> *Why am I writing this essay? Is it to inform, persuade, dissuade, entertain, answer a question, make a request, promote someone or something, and so forth? What is the purpose I want to achieve? What do I want to say? Who would care to read what I will write? Would they be young or old, males or females, educated, specialists, laity, superiors, subordinates, etc? What would they be interested in? Would they have heard about my topic? Would they know much about it? What would they know?*

As the teacher answers each of these questions, he or she verbalizes the implications in terms of content and style of delivery. For instance, if the target audience were non-specialists, the issues to be discussed would need to be of a general nature with focus on the global rather than the detailed picture. The language would need to be non-technical and ought to focus on what this kind of audience would be interested to know about. If the audience were experts, however, then the focus would need to be on the details, and the language may have to be technical and precise. Teachers will need to clearly state who the target audience is, their expectation of them as writers, and what style of delivery will be adopted. When drafting the essay, they must verbalize how this definition of the target audience affects whether they include a certain idea or exclude it, use jargon or not, keep complex structures or simplify them, and so forth.

Then they can move on to the stage of idea generation, namely brainstorming, free writing, list-making, asking questions, clustering, and so forth. The teacher may make the decision about the style of idea generation, say list-making, and then link the essay purpose to the ideas that he or she will list. Suppose that they were writing a proposal, they could verbalize, "*Since I am writing a proposal, my reader would need to know the pros and cons of it. OK, so let me think of the pros. . . . Let me think now of the cons*." If they were writing an informative essay, they could verbalize, "*The reader does not know X, so I must tell them the what, the who, the when, the where, the how, and the why*." If they were writing a compare and contrast essay, they could verbalize, "*For the reader to decide which is better, they need to know the advantages and disadvantages, the strengths and weaknesses. Let me first list the strengths of X. . . . Now its weaknesses are . . . let me move on to Y, its strengths are . . ., its weaknesses are . . .*" Throughout the idea generation process, the teacher must use the think-aloud protocol to demonstrate how knowledge of purpose and audience dictates the elements that will go in the outline, that is, the ideas to be included or excluded.

At the drafting stage, the think-aloud protocol, when captured with the tracking software, must portray the cognitive strategies that accompany the writing process. The teacher should endeavor to integrate previously learned concepts and previously used processes to enable students to develop their own unfailing schema for learning. Depending on the language level of the learner, the teacher needs to focus on different aspects of writing, one at a time. The verbalization may run across the entire piece of discourse, but the focus and the details ought to be on the teaching point that the teacher is demonstrating. Thus, the learner would watch how decisions are made and executed at the level of words, sentences, paragraphs, and discourse, but his or her attention is primarily drawn to the teacher's concentration on the tar-

get concept. The teacher should encourage students to take the tracking video home and must give them assignments on it that would motivate them to view it more carefully outside the classroom.

At the revision stage, the teacher needs to go through his or her written piece with tracking turned on. They would have to read it, stop occasionally, and delete, insert, rearrange, or fix whatever is needed. Throughout the revision, however, they must verbalize their thoughts, explain what their concern is, why it is problematic, and how best it can be fixed. They must be cognizant of their audience and their purpose, verbalizing the estimated impact of their decisions on the audience, and demonstrating how this impact can be altered with the replacement of a word, the modification of a sentence structure, or the rearrangement of sentences and paragraphs.

Once the teacher is satisfied that the learners have understood the target concept, he or she needs to require of them that they produce a piece of writing, be it a set of sentences, paragraphs, or an entire composition, and must demand that: (a) the composing process be on the computer, (b) that tracking be enabled, and (c) that students verbalize their thought processes the same way that the teacher demonstrated. This is essential for feedback purposes.

The next stage of writing instruction is feedback, which is as critical as the stage of teacher demonstration. Feedback is the response that teachers and peers give to a learner about his or her work and their progress. Not only does it provide an appraisal of the learner's performance but also reinforcement. The teacher needs to invite a student to volunteer to share his or her tracking video with the class in a workshop atmosphere. If deemed appropriate and if there is a specific lesson to be learned from one student's performance, the teacher may encourage that specific student to share his or her tracking video. The idea here is to offer feedback to a writer, to reinforce the target lesson, and to foster collaborative learning at the same time.

Before the class starts to view a student's tracking video, the teacher may be advised to reiterate the target concept that the video is meant to have implemented. The suggested procedure for viewing the video will now be presented. The video is played on a computer and is projected on a data-show in an IT-enabled traditional classroom or on the individual screens in a computer laboratory. Then, the teacher stops the video at junctures of interest to invite comments on what the student writer produced or comments on strategy use. Afterwards, the student writer is given the chance first to correct a mistake that he or she might have made or to comment on a strategy that they followed. Other students are then invited to comment. They may correct a mistake, offer alternative wording, or suggest a better strategy to follow. If the class were unable to identify a problem or to recognize a good strategy, the teacher may

weigh in and give a hint or lead the class to what he or she has in mind. If not apparent in the video, the student writer may be invited to explain why he or she followed a certain strategy or why they opted for a specific phrase. The teacher's role at this stage is to offer positive and negative reinforcement, encouraging the right thinking process and discouraging the wrong one. Focus must be more on how the student went about a task than on their product.

Throughout a feedback session, the teacher will give examples of useful strategies, elicit additional examples of good strategies, and encourage students to experiment with structures, wordings, organization, and so forth. He or she should enable students to experience the advantages of applying a good learning strategy and must foster all good learning tactics. Furthermore, they must train students to become more responsible for their own learning.

The benefit to the student writer subject of class discussion is unparalleled, for critical reflection is an essential component of the learning experience. It is through questioning and commenting on their and others' work that they derive meaning from their writing experience and get motivation to strengthen the fruitful cognitive strategies (such as the self-monitoring substrategy, where they check their drafts for capitalization, overall appearance, punctuation, and spelling) and alter the wrong ones (where they fail to practice self-monitoring altogether or fail to take one or more aspects of writing into account). It is through feedback sessions that students can develop their metacognitive awareness and learn how to learn writing. Their replayed tracked writing session enables them to relive the writing experience and to recall in vivid detail what they did and how they thought and felt about it. It gives them the opportunity to attend to their emotional responses that accompanied the decisions made during the process of writing and it invites them to re-evaluate these decisions, associating some with wrong outcomes and integrating others into their stock of learned concepts. In their next writing experience, they would validate the latter and avoid the former strategies.

The class as a whole stands to benefit from this interaction. It will strengthen what they already know and what they do well and will help them identify what they do not know and what they do wrongly. They will learn from each other. The teacher will not only facilitate such interaction, but must also have an agenda to teach students how to learn writing from their own experiences and from those of their teacher and peers. Primary teacher goals should include guiding students to acquire permanent learning skills, to self-assess, to be independent, and to be responsible for their own learning. The teacher's aim should be to make students believe that they are in control of their own learning, to make them conscious of their ability to monitor their own learning, and to make them aware of what they know and what they do not know.

## Pedagogical Implications

In view of the previous arguments and the authors' practical experience with tracking software, the following may be established as core teaching methodology standards for writing:

a. Writing teachers should aim to ultimately develop cognitive and metacognitive awareness.
b. Students should be clearly informed of the learning goals of each writing lesson.
c. Teachers must explain the subcomponents of the composing process and work to develop learners' abilities related to the different components.
d. As they instruct students on the process of writing, teachers must share with the class a model piece of writing that would resemble that which students have to produce. They must get students to answer questions that would create awareness of the essay features of discourse genre, thesis, organization, paragraph development, grammatical structures, and diction.
e. Teachers need to model the composing process by producing on the computer their own piece of text.
f. They are advised to use a piece of tracking software and utilize think-aloud protocols to model each of the subcomponents of the composing process. The tracking software would videotape their every move and document their procedures, thus producing a learning resource that student could refer to at a time of need.
g. As part of their instruction, teachers should demonstrate the target writing procedure with the tracking video of their own writing experience, commenting upon and directing student attention to subtleties that are essential to proper skill mastery.
h. While using the think-aloud protocol, teachers should verbalize the thoughts that cross their minds as they consider the use of specific strategies. They will have to verbalize how they narrow down their topic, define their audience, decide their communication goals, phrase their thesis statement, adopt a personal voice, translate outline points into topic sentences, elaborate on these sentences by explaining them, illustrating them with examples, supporting them with evidence, and so forth.
i. Once convinced that students have appreciated the craft of constructing the model, the teacher can ask them to emulate it by producing a similarly constructed piece of text on a different theme, perhaps a theme of their own.

j. Teachers must require of their students that they use computers to prepare their assignments and that they have a piece of tracking software installed.
k. All assignments must be written with tracking enabled and the tracking video must be saved for teacher feedback.
l. Teachers should provide learners with feedback by viewing their tracking video and commenting on their writing strategies as reflected in the video, commenting on their planning, revising, proofreading, and referring to information sources. They may in particular advise them on whether they have re-evaluated their opening and closing paragraphs, re-assessed their topic sentences and thesis statements, considered giving adequate details and examples, checked their sequence of points and paragraph transitions, and fixed their mistakes in spelling, grammar, vocabulary, and so forth. They may also advise on language problems.
m. Teachers should work on the development of sensitivity to language forms and communication strategies. By reviewing with the student-writer the composing process as it unfolds, the teacher could ask questions that would get the student to think of their social responsibility to readers, how readers would interpret a statement or a paragraph that the student wrote, how they would react to it, and which specific linguistic segment could have caused such a reaction.
n. Peer evaluation should also be encouraged, especially for validating reader response, attainment of purpose, and writer personal voice.

## Conclusion

In this paper, the usefulness of using tracking software to foster metacognition in writing instruction was presented. Throughout the process of writing, the teacher demonstrates the thinking that goes with writing, and the tracking software records their keyboard and mouse activities, their screen contents, and their verbalization. In this way they will create metacognitive awareness of the acts of composition. Students learn not only how the concepts that they were taught in class have been translated into the model essay that the teacher has composed, but also what the teacher was thinking as he or she was producing it.

To ensure that students learn the metacognitive activity associated with the learning of writing, the teacher should clearly state the learning goals and explain what needs to be accomplished and how. Whenever they decide on a certain strategy, they should explain why that strategy rather than another one was used in a particular context and must demonstrate how it is used. They must continu-

ously monitor what they do and ask themselves whether or not they are using the strategy correctly and whether the strategy is achieving its goal. They need to make it clear that more than one strategy is available in a particular context and that the writer needs to monitor their own strategy use. When one strategy stops delivering, they should switch to an alternative strategy. Throughout the process of writing, they monitor, self-assess, and self-manage; they evaluate their own cognition and direct their own cognitive development.

It is evident that writer reflection permeates the entire process of composition. Tracking together with the think-aloud protocol are capable of capturing such reflection and consequently rendering direct metacognitive instruction demonstrable and more effective. With metacognitive training and its empowerment, life-long learners can be created. Training students in the area of the thinking processes that accompany the writing process, the cognitive strategies used in learning how to write, critical thinking and problem-solving, and analysis and synthesis is what can create learners who can acquire knowledge independently.

Acknowledgments

The authors wish to acknowledge the feedback provided by the three anonymous reviewers of this paper and extend their gratitude to them.

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